(19) KOREAN INTELLECTUAL PROPERTY OFFICE (KR)

(12) LAID-OPEN PATENT GAZETTE (A)

(71) Applicant: Toshiba Corporation
                                              Taijo Nishimuro
                                              1-1-1 Shibaura Minato-ku, Tokyo-to, Japan

(72) Inventor: Hideki Okita
                                              204 Bizajuyamato,1-4-27 Fukamihigashi, Yamato-shi, Kanagawa-ken, Japan

(74) Agents: Sung-Ho Kim, Jin-Hee Kim, and Tae-Hong Kim

(54) VIDEO PROCESSING DEVICE

(57) Abstract

An OSD state confirmation part of a controller device transmits a confirmation instruction to an OSD control part of a target device through a 1394 bus and makes the OSD control part confirm the display state of an OSD synthesis part and inform the OSD state confirmation part of the display confirmation result. Based on the OSD state confirmation result, an operation selection part of the controller device determines whether the input of an input part is transmitted to the OSD control part of the target device or the OSD control part of the controller device. Therefore, since the controller device confirms the OSD state of the target device and determines the OSD display on the controller device and the operation object of a remote controller in accordance with the state, appropriate display contents can be provided and operated.

Representative figure:

Figure 1

Specification

Brief description of the figures

Figure 1 is a block diagram showing the constitution of an application example of the video transmission processing device of the present invention.

Figure 2 shows a detailed connection example and OSD of the video transmission display processing device of the present invention of Figure 1.

Figure 3 shows a display example in a conventional device to explain the present invention.

Figure 4 shows an OSD control example according to this application example.

Figure 5 explains the operation of a control panel utilizing a remote controller of a DTV display device according to this application example.

Figure 6 shows an example of a data format that is used in confirming an OSD state according to this application example.

Figure 7 shows another example of a data format that is used in confirming an OSD state according to this application example.

Figure 8 shows a first example of the display of a DTV control panel showing a DVD title menu according to this application example.

Figure 9 shows a second example of the display of a DTV control panel showing a DVD title menu according to this application example.

Figure 10 shows a third example of the display of a DTV control panel showing a DVD title menu according to this application example.

Figure 11 shows a display example in a conventional device to explain the present invention.

Figure 12 is a flow chart showing the operation in the case where a controller device controls the OSD of a target device according to this application example.

Figure 13 is a flow chart showing the operation in the case where the OSD of the controller device is controlled based on the confirmation result after the controller device confirms an OSD state change of the target device.

Figure 14 is a flow chart showing the operation for control in the case where the controller device receives a button operation result from an input device such as a remote controller.

Figure 15 is a flow chart showing the operation for control in the case where the controller device receives a button action result from an input device such as remote controller.

Figure 16 is a flow chart showing the operation for preventing an overlapping display of the same error message on both the controller device and the target device.

Explanation of numerals of the main parts of the figures
A   Controller device (DTV display device)
A1   Second 1394 processing part
A2   Second OSD synthesis part
A3   Display part
A4   Second OSD control part
A5   OSD state confirmation part
A6   Operation selection part
A7   Input part

B   Target device

B1   Video output part

B2   First OSD synthesis part

B3   First 1394 processing part

B4   First OSD control part

B5   OSD state notification part

C   Remote controller

Detailed explanation of the invention

Purpose of the invention

Technical field of the invention and prior art of the field

The present invention pertains to a video transmission device and a video display device that displays video signals transmitted through a high-speed serial bus from the aforementioned video transmission device. In particular, the present invention pertains to a display control technique that is employed for the case where both a video transmission device and a video display device have an OSD (On Screen Display) function.

Recently, a high-speed serial bus (hereinafter, called '1394 bus') of IEEE 1394 standards that can transmit large-capacity digital video signals has become widely utilized. The aforementioned 1394 bus, for example, can be utilized in the interconnection of a DTV (Digital Television Receiver) and a DVD (Digital Versatile Disc reproducing device). In this case, since information can be transmitted in two ways between a DTV and a DVD, if the DTV makes a request for an arbitrary video to the DVD, this request signal is transmitted to the DVD via the 1394 bus. If necessary, a digital video signal, which is reproduced by the DVD, is transmitted at high speed to the 1394 bus, and the video signal is displayed on the DTV.

However, if the controller device (video display device such as a DTV) controls a target device (video transmission device such as a DVD) via a 1394 bus, if the aforementioned target device has an OSD function of overlaying a sub-video (hereinafter, called 'OSD') on video signals before the transmission, the following problems can be generated.

First, since there is no means to sense the overlapping display between the OSD of the controller device and the OSD of the target device, if the OSD of the controller device and the OSD of the target device overlap, one of the two OSDs is canceled, or other display programs are generated. In addition, if each device is controlled by displaying a control panel display screen using the OSD function or a control panel on the screen is operated by controlling the target device using a cursor key, etc., the source of the device that has transmitted keys, such as a cursor key, which are used commonly for both devices, is indistinct. Moreover, if these two

devices display warning messages showing the same content because of errors, an overlapping display cannot be avoided.

Technical problems to be solved by the invention

As mentioned above, in the prior art, if a video display device controls a video transmission device via a high-speed serial bus and both the video display device and the video transmission device have an OSD function, OSDs of both devices overlap each other, hindering an appropriate display or control.

In order to solve the aforementioned problem, the present invention provides a video processing device such as a controller device and a target device that can appropriately control an OSD state synthesized by a controller device or target device.

The video processing device as a controller device of the present invention consists of a video request and reception device that receives a video from a video transmission device, which selectively synthesizes a transmitting video with a sub-video, via a communication line; a sub-video synthesis means that selectively synthesizes the sub-video with the received video obtained from the aforementioned video request and reception device; a display means that displays the received video synthesized with the sub-video by the aforementioned sub-video synthesis means; a sub-video synthesized state confirmation means that transmits a confirmation request to the aforementioned video transmission device to confirm the sub-video synthesized state, receives a response to the aforementioned confirmation signal from the corresponding video supply source, and confirms the sub-video synthesized state from the received video; and a sub-video control means that controls a sub-video display state of the aforementioned sub-video synthesis means in accordance with the sub-video synthesis state confirmed by the aforementioned sub-video synthesis state confirmation means.

In addition, the video processing device as a target device consists of a sub-video synthesis means that selectively synthesizes a video with a sub-video; a video transmission means that transmits the video selectively synthesized with the sub-video by the aforementioned sub-video synthesis means to the aforementioned video display device via a communication line; and a sub-video synthesis notification means that informs the aforementioned video display device of the sub-video synthesis state synthesized state by the aforementioned sub-video synthesis means in response to the sub-video synthesized state confirmation request transmitted from the aforementioned video display device via the aforementioned communication line.

If the video processing devices as a controller device and a target device with the aforementioned constitutions, for example, are interconnected via a high-speed serial bus, the controller device confirms the sub-video synthesized state of the target device and can determine

a sub-video display on the controller device and an operation object of a user input operation in accordance with the state, thus enabling appropriate display content supply and operation.

Additional purposes and advantages of the present invention will be partially clarified through the following explanation or will be obtained by application examples of the present invention. The purposes and advantages of the present invention can be realized and achieved by the following means and their combinations.

Constitution and operation of the invention

Next, using the attached figures, which constitute part of the specification and show current preferred application examples of the present invention, along with the above general explanation and the detailed explanation of the following preferred application examples, the principle of the present invention will be explained.

The application examples of the present invention will be explained with reference to the figures.

Figure 1 is a block diagram showing the constitution of an application example of the video transmission processing device of the present invention. A is a controller device such as a DTV that can display a video, and B is a target device such as a DVD for transmitting the video controlled by the controller device (A).

In the target device (B), a video output part (B1) outputs a video stream from a medium (DVD medium, etc.), broadcast waves, and other video devices, and the aforementioned video stream is transmitted to a first OSD synthesis part (B2). If necessary, the first OSD synthesis part (B2) synthesizes (overlays) a graph (OSD) such as a first control panel with the input video stream. The aforementioned graphic is also called a 'sub-video' and is related to a graphic (OSD) for control such as a control panel, though it is different from the sub-picture defined in the DVD standards. However, the sub-picture defined in the DVD standards can be processed like a sub-video.

The first OSD synthesis part (B2) is controlled by a first OSD control part (B4) that will be described later. The video synthesized with the graphic in the first OSD synthesis part (B2) is converted into an isochronous packet defined in IEEE 1394 by a first 1394 processing part (B3), and the aforementioned isochronous packet is transmitted to the controller device (A) via a 1394 bus.

In the controller device (A), the isochronous packet transmitted via the 1394 bus is transmitted to a second 1394 processing part (A1). The second 1394 processing part (A1) reconverts the received isochronous packet into a video stream, and if necessary, a second OSD synthesis part (A2) synthesizes a graphic (OSD) such as a second control panel with the video

stream. A display part (A3) then displays the synthesized video stream. The second OSD synthesis part (A2) is controlled by a second OSD control part (A4) that will be described later.

The first OSD synthesis part (B2) and the second OSD synthesis part (A2), if necessary, encode or decode the video stream. Specifically, the video output part (B1) outputs MPEG 2-TS as a video stream, and the first OSD synthesis part (B2) decodes the received MPEG 2-TS to a baseband, OSD-processes the baseband, and transmits the processed baseband to the display part (A3).

An OSD state confirmation part (A5) of the controller device (A) transmits a confirmation instruction to the first OSD control part (B4) of the target device (B) and confirms the display state of the first OSD control part (B2). As detailed examples of the display state, there are discrimination of display and non-display of a video, display range, error code, etc. The first OSD control part (B4) confirms the display state of the first OSD synthesis part (B2) and has the OSD notification part (B5) inform the OSD state confirmation part (A5) of the controller device (A) of a change via the 1394 bus, if the display state changes.

Based on the confirmation result of the OSD state confirmation part (A5), an operation selection part (A6) of the controller device (A) selects whether the input (for example, key operation input of a remote controller (C)) from an input part (A7) is transmitted to the first OSD control part (B4) of the target device (B) or the second OSD control part (A4) of the controller device (A). If the input operation of the input part (A7) is transmitted to the first OSD control part (B4) of the target device (B), the second 1394 control part (B3) converts the input into a format for the 1394 bus and transmits its resultant data to the first 1394 control part (A1).

Figure 2 shows a detailed connection example of the video transmission display device with the aforementioned constitution and an OSD example. Here, a detailed example of the target device (B) is a DVD player, and a detailed example of the controller device (A) is a DTV display device.

An OSD such as control panel (OB1) is overlaid on a media video inserted into the DVD player (B), and the resultant video as a video stream is transmitted through the IEEE 1394 bus to the DTV display device. The transmitted video stream is displayed on a display screen of the DTV display device (A). The DTV display device (A), if necessary, overlays an OSD such as control panel (OA1) on the transmitted video stream. The overlaid control panels (OA1, OB1) are operated by a cursor key of the remote controller (C).

In a conventional device constitution, since the control panel (OB1) of the DVD player (B) is transmitted in an overlaid state on the video stream, the OSD display state of the DVD player cannot be confirmed in the DTV display device (A). Therefore, the DTV display device (A) can overlay the control panel OA1 on the control panel OB1 of the DVD player (B) and

cannot determine whether the operation of the cursor key, etc., of the remote controller (C) should be processed in the DTV display device (A) or processed in the DVD displayer (B).

In the device constitution of this application example, the DTV display device (A) can confirm the OSD state of the DVD player (B), obtain an appropriate display content by determining the OSD of the DTV display device (A) and the operation object of the remote controller (C) in accordance with the confirmation result, and enable an appropriate operation.

Figure 3 shows a display example in a conventional device to explain the present invention. In Figure 3, the target device (B) is constituted by a DVD player, and the controller device (A) is constituted by a DVT display device.

In Figure 3, the title menu (OB1) is a control panel (menu) that is displayed using an OSD function by the DVD player (B) so that a user can select a title, and the title menu (OB1) shows a title list that is recorded in a DVD medium. The control panel (OA1) is displayed using the OSD function by the DTV display device. The DTV display device (A) controls the DVD player (B) by using the aforementioned control panel (OA1). As detailed examples of the control of the DVD player (B), there are medium operations such as playback, stop, and fast forward and menu invocation of top menu, title menu, setup menu, etc. Both the title menu (OB1) and the control panel (OA1) are controlled by using the remote controller (C) (arrow keys and enter key) of the DTV display device (A).

Figure 3 shows an example in which the title menu (OB1) of the DVD player (B) is displayed by operating a cursor key so that the title button of the control panel (OA1) is pressed. In addition to the title menu (OB1), the menu display method of the DVD player (B) includes an automatic display of a menu such as a multiangle control menu during playback in accordance with the DVD medium contents and an automatic erasure of the menu through menu operation. A menu is displayed or is not displayed at various timings.

In the prior art, since there is no means to confirm the display state of the title menu (OB1) in the DTV display device (A), the control panel (OA1) cannot be appropriately displayed, and the aforementioned two menus sometimes overlap with each other. Therefore, in order to operate the menu of the back face, the previous menu has to be manually hidden. In addition, if all the menus of both devices are to be hidden, since there is no means for confirming the menu non-display state of the DVD player (B) in the DTV display device (A), the aforementioned display device meaninglessly transmits an 'AV/C' command corresponding to the cursor key to the DVD player (B). Moreover, if the DTV display device (A) has to be controlled (channel or volume operation by using arrow keys), the control cannot be switched.

In the device constitution of this application example, the controller device (DTV display device) (A) can appropriately provide control while confirming the OSD display state of the target device (DVD player).

Figure 4 shows an OSD control example according to this application example.

The display screen shown in Figure 4(A) shows how an OSD is displayed on the DTV display device (A). As a prescribed condition for the aforementioned display screen, an OSD is displayed on the DVD player, forming the display screen state shown in Figure 4(B). According to this application example, since the DTV display device (A) can confirm the OSD state of the DVD player (B), as mentioned above, appropriate operations such as OSD change and OSD non-display in the DTV display device can be implemented.

For example, the control panel (OA1) of the DTV display device is operated to transmit a 'RootMenu' display command to the DVD player (B), its player displays its OSD, and the DTV display device (A) can reliably confirm the OSD display state, thus enabling high-reliability control. In addition, when the DVD medium of the DVD player (B) is reproduced, even if the control panel is displayed on a multiangle part, the DTV display device (A) can determine the OSD state change. Moreover, as shown in Figures 4(A)-4(C), since a message or icon such as 'DTV' for DTV operation and 'DVD' for DVD operation indicating an operation object can be displayed, a user can operate the devices without confusion.

Figure 5 explains the operation of a control panel by using the remote controller (C) of the DTV display device (A) according to this application example.

In Figure 5, for an input (cursor operation, etc.) from the remote controller (C), an operation object is selected in accordance with the OSD states of the DTV display device (A) and the DVD player (B). Specifically, if the OSD of the DTV display device (A) is in a display state, the input of the remote controller is utilized in controlling the control panel (OA1) of the DTV display device (A). If the OSD of the DVD player is in a display state, the input of the remote controller is converted into the 'AV/C' command format, and this command is transmitted to the DVD player (B) via the 1394 bus and utilized in controlling the control panel (OB1) of the DVD player (B).

In the aforementioned method, even if there is a DTV/DVD switching button in the remote controller (C) of the DTV display device (A), whether the OSD of the DTV display device (A) is controlled can be reliably determined. Therefore, for example, if a prescribed arrow key is pressed, the remote controller operation command can automatically instruct the DTV display device (A) or DVD player (B). In addition, a user does not need to operate the switching button, so the purpose can be achieved by fewer button operations.

However, clearly, the remote controller (C) of the DTV display device (A) can include a DTV/DVD switching button. In this case, for example, even if an infrared code in the remote controller (C) is directly transmitted to each of the DTV display device (A) and the DVD player (B), since the operation object in the constitution of this application example can be specified by displaying an icon or message, a user can carry out an appropriate switching operation.

Figure 6 shows an example of a data format that is used in confirming an OSD state according to this application example.

In this application example , an example is given of a data format using 'Info Books' described in 'Enhancement to the AV/C General Specification 3.0' published in 1394TA.

The aforementioned data format is stored in the target device (B), and the controller device (A) is read by using command 'READ INFO BLOCK,' etc. The OSD display state, for example, is stored in a form of 70h (display) and 60h (non-display) in an 'osd_state' part. Specifically, 'osd_status_info_block' is stored in 'source_plug_status_area_info_block' described in 'A/C Disc Subunit General Specification 1.0' published in 1394TA.

In 'osd_status_info_block,' the display content (error message code, etc.) or the cursor position on the control panel is included in addition to the OSD display and non-display discrimination. In this application example, the data format is not limited.

Figure 7 shows another example of data format that is used in confirming an OSD state according to this application example. This application example shows a data format example using 'AV/C Status' described in 'AV/C General Specification 3.0' published in 1394TA. The controller device (A) transmits this data format in the form of an 'AV/C Status' command to the target device (B), and the target device (B), for example, stores the OSD state in a form of 70h (display) and 60h (non-display) in the 'osd status' part. In addition, if the aforementioned format is applied to 'AV/C Notify' described in 'AV/C General Specification 3.0,' when the OSD state of the target device (B) is changed, the target device (B) informs the controller device (A) of the aforementioned change content.

The 'AV/C Status' or 'AV/C Notify' command includes the display content (error message code, etc.) or the cursor position on the control panel in addition to the OSD display and non-display discrimination. In this application example, the data format is not limited.

Figure 8 shows a first display example of the DTV control panel (OA1) for displaying the DVD title menu (OB1) according to this application example. In Figure 8, the DTV control panel (OA1) is hidden so that the DVD title menu (OB1) is not hidden.

Figure 9 shows a second display example of the DTV control panel (OA1) for displaying the DVD title menu (OB1) according to this application example. In Figure 9, a DTV control panel (OA2) is displayed like an icon (OA2) so that the DVD title menu (OB1) is not hidden. A reduced image can also be used at the display position of the icon (OA2).

Figure 10 shows a third display example of the DTV control panel (OA1) for displaying the DVD title menu (OB1) according to this application example. In Figure 10, since the number of buttons of the DTV control panel is not limited to a minimum required value, the DTV control panel (OA1) does not overlap the display region of the DVD title menu (OB1). In addition, the

display position of the title menu (OB1) is obtained from the DVD player, and the DTV control panel (OA1) is arranged at an appropriate position.

In the example of Figure 10, if both the DTV control panel (OA1) and the DVD title menu (OB1) are displayed, if necessary, the operation object can be switched to the DTV control panel (OA1) or DVD title menu (OB1). As a specific switching method, there is a step of providing an operation object selection button to the remote controller (C) or a step of operating the menu by up and down arrow keys and a step of switching the operation object by left and right arrow keys. In this case, there are several columns of buttons in the DVD player (B), and even if the left and right arrow keys are used in the DVD title menu operation, in this application example, since the OSD content like the position of the operation button must be obtained, the arrow keys are operated only when the menu or panel is suitable for the screen, thus enabling switching control of the operation object.

Figure 11 shows a display example in an ordinary device to explain the present invention.

Figure 11 shows an error generation display example due to medium non-insertion in the case where the DTV display device (A) plays the DVD player (B). In the prior art, since there is no means for confirming the display content of the DVD player (B) in the DTV display device (A), a warning message (OB3) showing no medium insertion is displayed on both the DTV display device (A) and the DVD player (B). On the other hand, in the constitution of this application example, the DTV display device (A) can confirm whether the warning message (OB3) showing no medium insertion is displayed on the DVD player (B) and can control the display of the warning message (OA3) on the DTV so that the display is prohibited, thus enabling an appropriate display.

Figure 12 is a flow chart showing the operation in the case where the controller device (A) controls OSD of the target device (B) according to this application example.

At step S1, the OSD of the controller device (A) is displayed. At step S2, an operation command is transmitted to the target device (B). As detailed examples of the operation command, there are 'RootMenu' or 'SetupMenu,' 'Play,' and 'Stop' of the DVD player. At step S3, a response to the transmitted operation command is received. At step S4, an OSD state of the target device (B) is requested, and at step S5, a response to the OSD state request is received. At step S6, the OSD state of the target device (B) is checked, and whether an OSD is displayed on the target device (B) is confirmed. If an OSD is not displayed on the target device (B), the processing repeats from step S2. If an OSD is displayed on the target device (B), the OSD state of the controller device is changed. As detailed examples of a display state change, there are non-display, icon formation, reduced display, etc.

According to this flow chart, even if an OSD change of the target device (B) due to the operation of the target device (B) depends on the kind of device (for example, several functions

are allocated to a single remote controller button, and different operations are carried out in accordance with the current mode), the controller device (A) can reliably change the OSD state.

Figure 13 is a flow chart showing the operation in the case where OSD of the controller device (A) is controlled based on the confirmation result, after the controller device (A) confirms an OSD state change of the target device (B).

At step S11, the OSD state of the target device (B) is requested. At step S12, the OSD state is received from the target device (B). At step S13, an OSD change of the target device (B) is determined, and if there is no change, the processing of the steps S12 and S13 is repeated.

If the OSD state has changed, at step S14, whether the OSD of the target device (B) is in a display state is confirmed, and if it is in a display state (the non-display state has changed to a display state), the OSD state of the controller is changed at step S15. As detailed examples of a display state change, there are non-display, icon formation, reduced display, etc.

If the OSD of the target device (B) is in a non-display state (the display state has changed to a non-display state), at step S16, whether the OSD state of the controller device (A) has been changed is determined. If the OSD state has been changed, the OSD state of the controller device (A) is restored to the original state at step S17. As detailed examples of state restoration, the OSD display of the controller device (A) is changed to an icon and a reduced display is shown at ordinary size.

Therefore, when the DVD is viewed, even if the DVD player automatically displays a menu on a multiangle part, the OSD of the controller device (A) is appropriately controlled to avoid an OSD overlapping problem.

Figures 14 and 15 are flow charts showing the operation for control in the case where the controller device (A) receives a button operation result from an input device such as remote controller (C).

At step S21, a button operation result of the remote controller is received. The remote controller operation (when the button is pressed) result, for example, is transmitted in an infrared code form to the controller device (A). Next, at step S22, the OSD state of the controller device (A) and the target device (B) is confirmed, and the processing is branched into different processes in accordance with the display state.

If OSDs of both the controller device (A) and the target device (B) are in a non-display state (R1), the button operation content is confirmed as shown in Figure 15(A). As detailed examples of the button operation content, there are number buttons, arrow buttons, menu buttons, etc. Next, at step S24, the current operation mode of the controller device (A) is confirmed. As detailed examples of the operation mode, there are a BS digital reception mode and a DVD display mode. Based on the results of the steps S23 and S24, whether the operation object is the target device (B) is determined at step S25, and the processing is branched into different

processes. The determination is based on the combination of the operation mode and the button operation content. Therefore, even if a given menu button is operated, a DVD title menu is displayed in the DVD display mode, and an electronic program list is displayed in the BS digital reception mode.

If only the OSD of the controller device (A) is displayed (R2), as shown in Figure 15(B), whether the operation of the controller device (A) is required is determined at step S26, and if an operation must be carried out, the controller device (A) processes the received button operation at step S27.

If only the OSD of the target device (B) is displayed (R3), as shown in Figure 15(C), the button operation is converted into an operation command of the target device (B) and transmitted to the target device (B) at step S29. As a detailed example of the conversion into an operation command of the target device (B), there is a conversion into an 'AV/C' command.

If both OSDs of the controller device (A) and the target device (B) are displayed (R4), as shown in Figure 15(D), the button operation content is confirmed at step S30, and the display content of the operation object OSD is confirmed at step S31.

As a detailed example of display content confirmation, there is a button operation position. Based on the confirmation results of steps S30 and S31, whether changing of the operation object is required is determined. If changing of the operation object is required, as detailed examples, there are the case where the current operation button position is at the left end and the case where the button is operated in the left direction. If changing of the device to be operated is required, the operation object is reliably changed at step S33. If changing of the device to be operated is not required, whether the operation object is the target device (B) or the controller device (A) is determined at step S34, and the processing is branched into different processes.

Figure 16 is a flow chart showing the operation for avoiding an overlapping display of the same error message on both the controller device (A) and the target device (B).

At step S41, the error content of the controller device (A) is confirmed, and at step S42, the OSD display content of the target device (B) is confirmed. As a detailed example of the display content, there is an error code corresponding to an error message that is displayed on the target device (B). Next, at step S43, whether the confirmation result content at step S41 is the same as the error content displayed on the target device is determined. If the contents are the same, the controller device (A) operation is finished without implementing a prescribed processing. If the contents are not the same or if no error message is displayed on the target device (B), an error message is displayed on the controller device (A) at step S44.

As seen from the above processing flow, in the present invention, the video display device as a controller device confirms the OSD state of the video transmission device as a target

device and can be appropriately controlled (OSD display erasure, reduction, transmission, etc., in the controller device) in accordance with the OSD state of the confirmation result. In addition, since the operation object can be displayed with an icon or message, a user can operate the device without confusion.

As explained above, the present invention can provide video processing devices as a controller device and a target device that can appropriately control the OSD state synthesized by the controller device or target device.

A person skilled in the art can easily ascertain additional advantages and improvements. Therefore, the present invention from a broader viewpoint is not limited to the detailed explanation and the representative application example described in this specification. The present invention can thus be variously modified in the range wherein deviation from the general concept of the present invention as limited to the attached claim scope and the like does not occur.

Effect of the invention

As explained above, according to the present invention, video processing devices as a controller device and a target device can appropriately control an OSD state synthesized by a controller device or target device.

<u>Claims</u>

1. A video processing device as a controller device; said video processing device being characterized in that it consists of a video request and reception device that receives a video from a video transmission device, which selectively synthesizes a transmitting video with a sub-video, via a communication line; a sub-video synthesis means that selectively synthesizes the sub-video with the received video obtained from said video request and reception device; a display means that displays the received video synthesized with the sub-video by said sub-video synthesis means; a sub-video state confirmation means that transmits a confirmation request to said video transmission device to confirm the sub-video synthesized state, receives a response to said confirmation signal from the corresponding video supply source, and confirms the sub-video synthesized state from the received video; and a sub-video control means that controls a sub-video display state of said sub-video synthesis means in accordance with the sub-video synthesis state confirmed by said sub-video synthesis state confirmation means.

2. A video processing device, consisting of a sub-video synthesis means that selectively synthesizes a transmitting video with a sub-video; a video transmission means that transmits the video selectively synthesized with the sub-video by said sub-video synthesis means to said video display device via a communication line; and a sub-video synthesis notification means that

informs said video display device of the sub-video synthesis state synthesized by said sub-video synthesis means in response to the sub-video synthesized state confirmation request transmitted from said video display device via said communication line.

3. The video processing device cited in Claim 1 or 2, wherein said communication line is a high-speed serial bus.

4. The video processing device cited in Claim 1 or 2, wherein said sub-video synthesis means synthesizes a menu selection video or control panel video, which is used in controlling said video device, as said sub-video.

5. The video processing device cited in Claim 1, wherein if said sub-video state confirmation means determines a change to a sub-video synthesized state of the received image, said sub-video control means changes the display form of a display item that is synthesized by said sub-video synthesis means.

6. The video processing device cited in Claim 5, wherein if said sub-video state confirmation means determines a change to a sub-video non-synthesized state of the received image, said sub-video control means restores the display form changed by said sub-video synthesis means to the original display form.

7. The video processing device cited in Claim 1, wherein said sub-video synthesized state confirmation means confirms the range where the sub-video is synthesized with the received video; and said sub-video control means controls said sub-video synthesis means so that the display position of the synthesizing sub-video does not overlap the sub-video range synthesized with the received video.

8. The video processing device cited in Claim 1, wherein an identifying sub-video for distinctly displaying whether the current displaying sub-video is a sub-video from said video processing device or a sub-video from said video transmission device is synthesized with a displaying video based on the confirmation result of said video synthesized state confirmation means.

9. The video processing device cited in Claim 1, wherein an identifying sub-video is synthesized with a displaying sub-video based on the confirmation result of said video synthesized state confirmation means; and said sub-video control means controls a sub-video having the same content as that of the sub-video that it synthesized with the received image by said sub-video synthesis means.

10. The video processing device cited in Claim 1, wherein an input means for inputting a user operation and an operation object selection means for switching the operation object based on the confirmation result of said sub-video synthesized state confirmation means are provided.
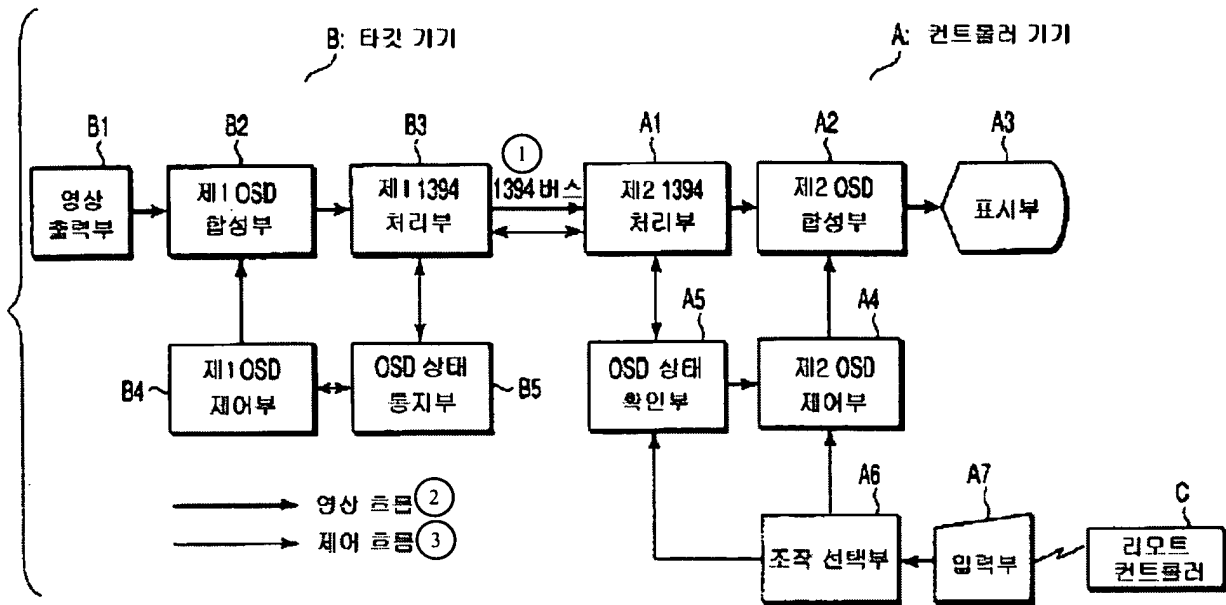
B: 타깃 기기   A: 컨트롤러 기기

Figure 1

Key: A   Controller device
      A1   Second 1394 processing part
      A2   Second OSD synthesis part
      A3   Display part
      A4   Second OSD control part
      A5   OSD state confirmation part
      A6   Operation selection part
      A7   Input part
      B   Target device
      B1   Video output part
      B2   First OSD synthesis part
      B3   First 1394 processing part
      B4   First OSD control part
      B5   OSD state notification part
      C   Remote controller
      1   1394 bus
      2   Video flow
      3   Control flow
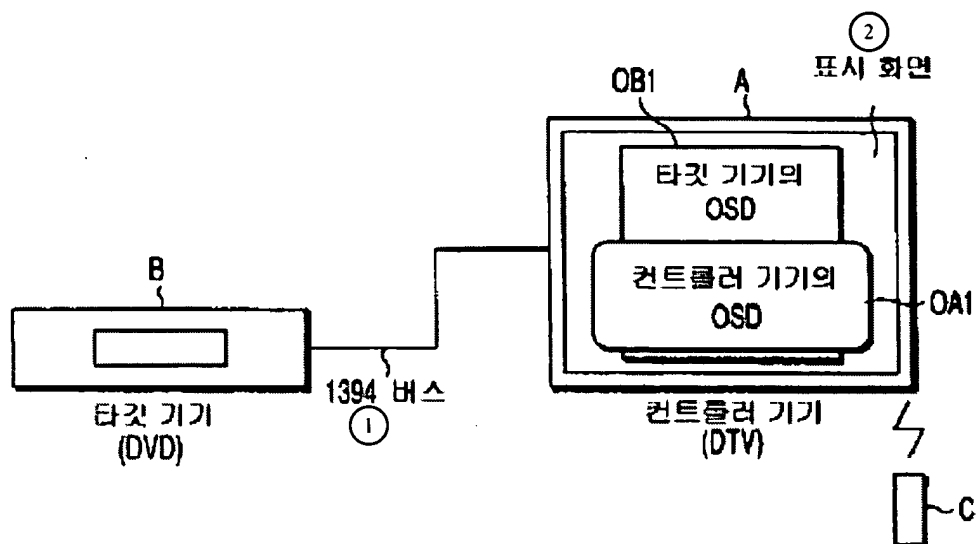
Figure 2

Key: A   Controller device (DTV)
      B   Target device (DVD)
      OA1   OSD of the controller device
      OB1   OSD of the target device
      1   1394 bus
      2   Display screen
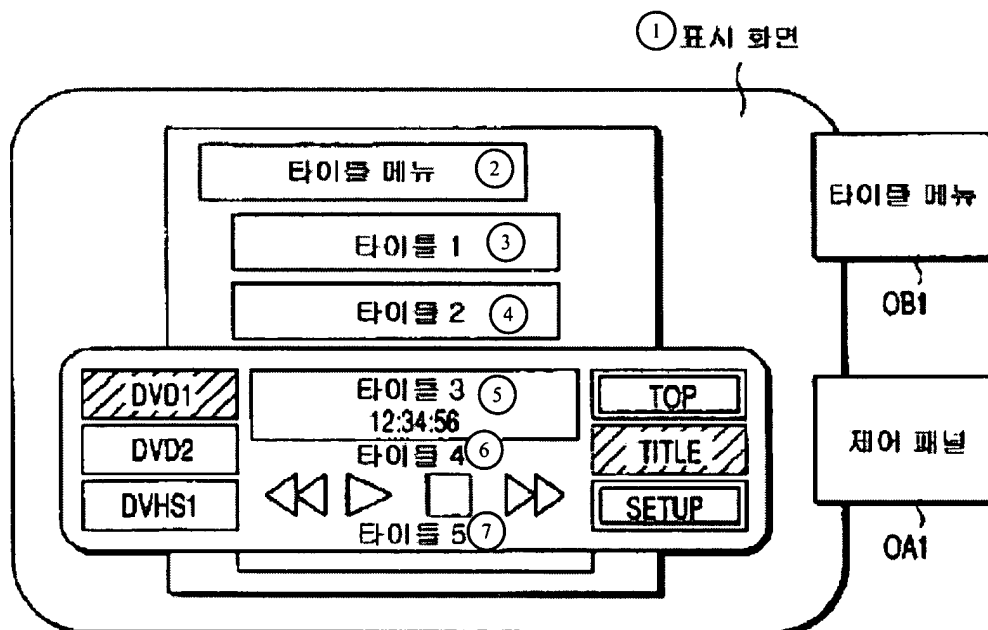
Figure 3

Key: OA1   Control panel
      OB1   Title menu

1	Display screen
2	Title menu
3	Title 1
4	Title 2
5	Title 3
6	Title 4
7	Title 5
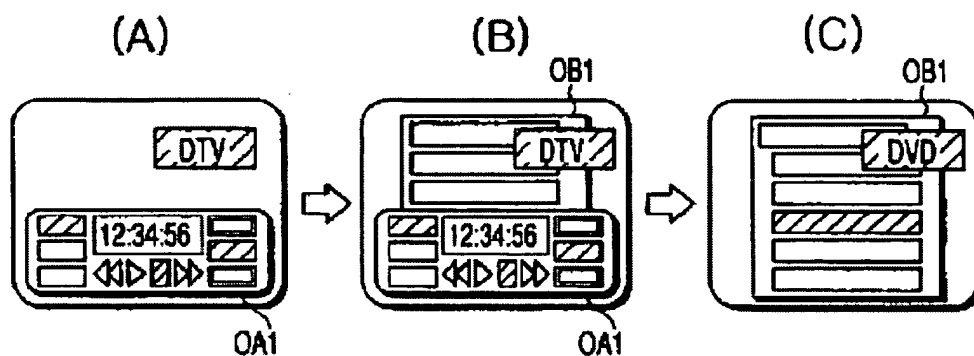
Figure 4
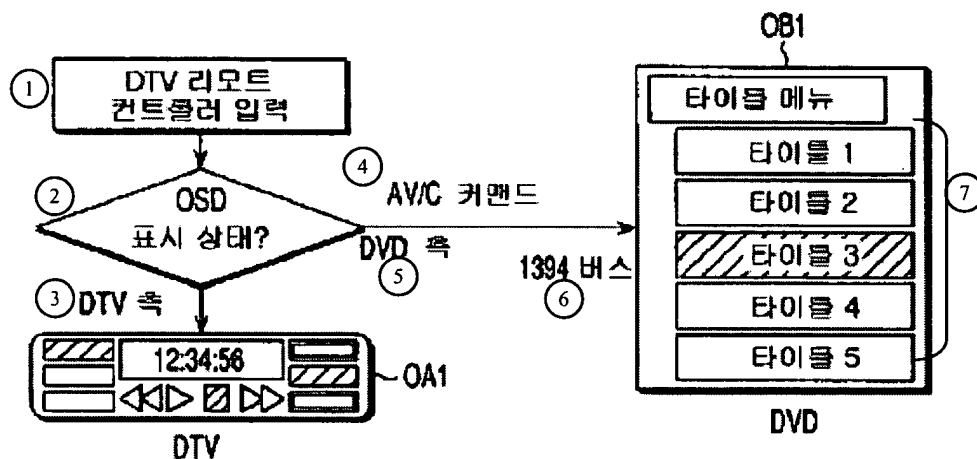
Figure 5

Key:
OB1	Title menu
1	DTV remote controller input
2	OSD display state?
3	DTV side
4	AV/C command
5	DVD side
6	1394 bus
7	Title 1
	Title 2

Title 3
Title 4
Title 5

osd_status_info_block	
Address Offset	Contents
00 00$_{16}$	conpound_length
00 01$_{16}$	
00 02$_{16}$	info_block_type=88 30$_{16}$ (osd_status_info_block)
00 03$_{16}$	
00 04$_{16}$	primary_field_length
00 05$_{16}$	
00 06$_{16}$	osd_status

Figure 6

	msb						lsb
opcode	OSD STATUS(7A$_{16}$)						
operand[0]	osd_status						

Figure 7
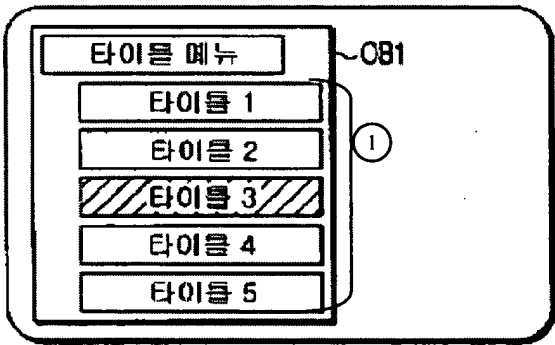
Figure 8

Key: OB1 Title menu
        1   Title 1
                Title 2
                Title 3
                Title 4
                Title 5
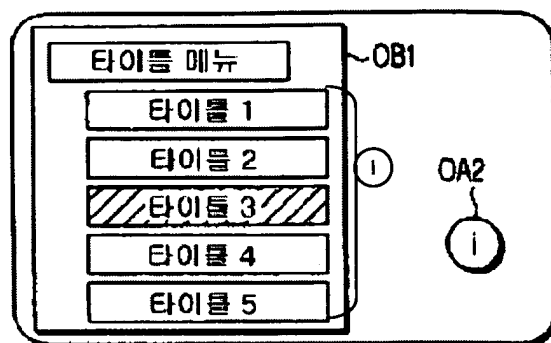
Figure 9

Key: OB1   Title menu
      1   Title 1
             Title 2
             Title 3
             Title 4
             Title 5
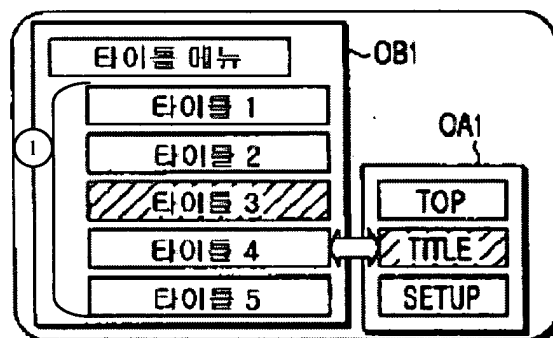
Figure 10
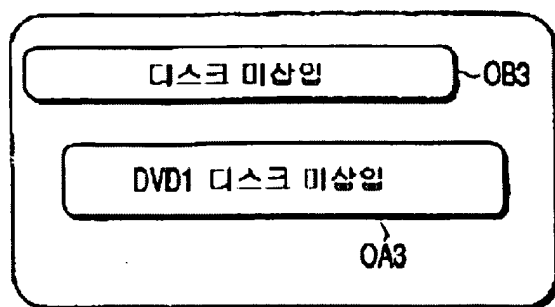
Key: OB1   Title menu
      1   Title 1
             Title 2
             Title 3
             Title 4
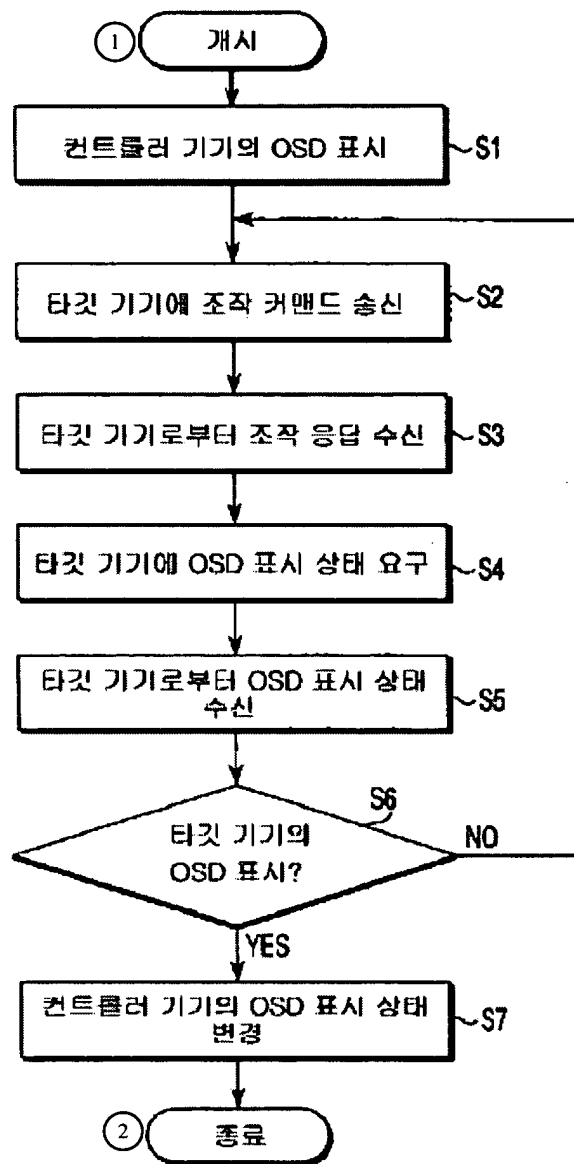   Title 5

Figure 11

Key: OA3   DVD1 disk non-insertion
       OB3   Disk non-insertion

Figure 12

Key: S1   OSD display of the controller device
     S2   Operation command transmission to the target device
     S3   Operation response reception from the target device
     S4   OSD display state request to the target device
     S5   OSD display state reception from the target device
     S6   OSD display of the target device?
     S7   OSD display state change of the controller device
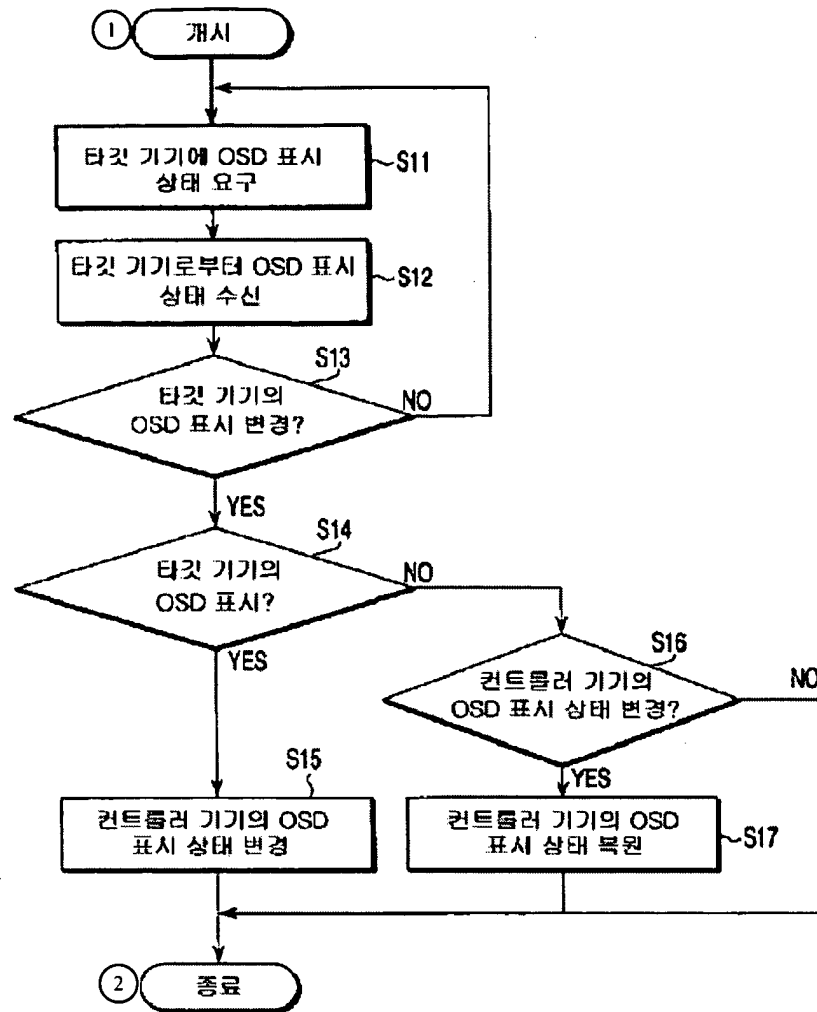   1   Start
     2   End

Figure 13

Key: S11   OSD display state request to the target device
      S12   OSD display state reception from the target device
      S13   OSD display change of the target device?
      S14   OSD display of the target device?
      S15   OSD display state change of the controller device
      S16   OSD display state change of the controller device?
      S17   OSD display state restoration of the controller device
      1   Start
      2   End
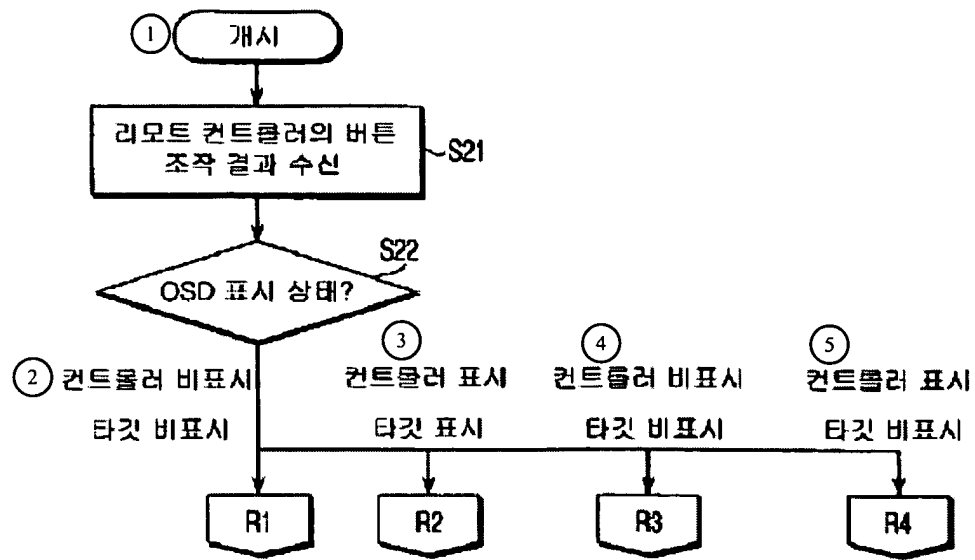
Figure 14

Key: S21   Button operation result reception of the remote controller
      S22   OSD display state?
      1   Start
      2   Controller non-display
              Target non-display
      3   Controller display
              Target display
      4   Controller non-display
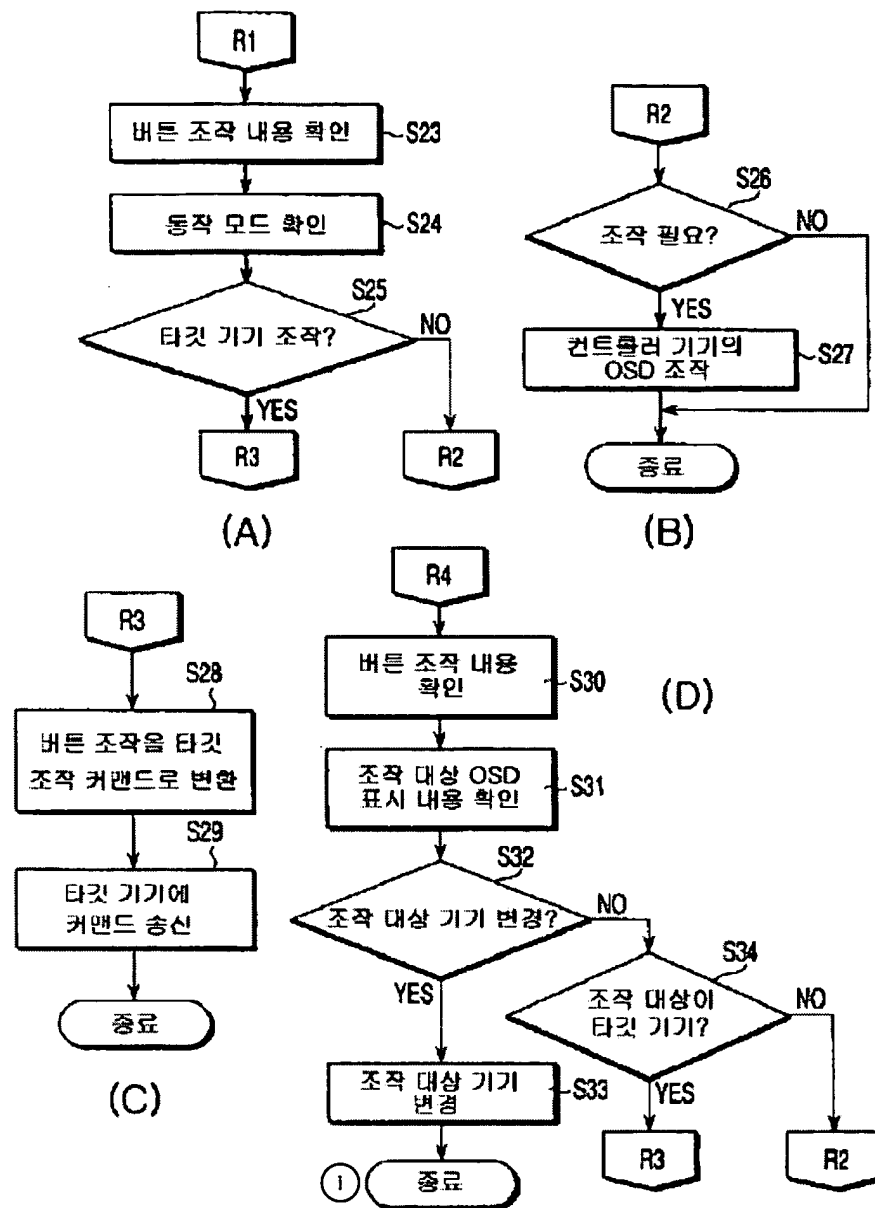   Target non-display
      5   Controller display
              Target non-display

Figure 15

Key:
S23   Button operation content confirmation
S24   Operation mode confirmation
S25   Target device operation?
S26   Operation required?
S27   OSD operation of the controller device
S28   Conversion of the button operation into a target operation command
S29   Command transmission to the target device
S30   Button operation content confirmation
S31   Operation object OSD display content confirmation
S32   Operation object device change?
S33   Operation object device change

S34 Is the operation object the target device?
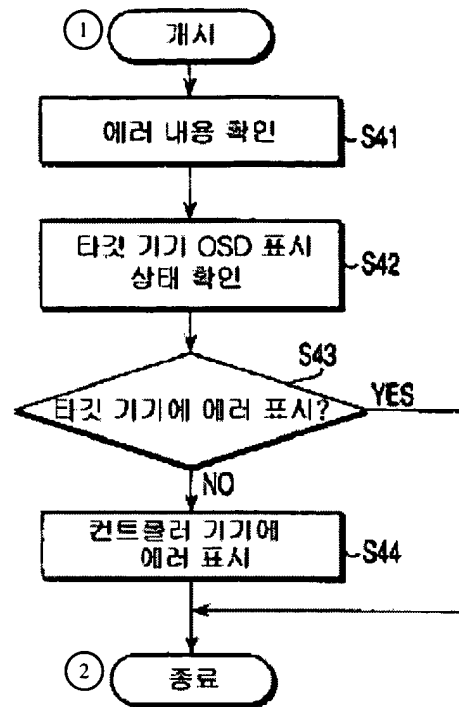1 End

Figure 16

Key: S41 Error content confirmation
S42 Target device OSD display state confirmation
S43 Error display on the target device?
S44 Error display on the controller device
1 Start
2 End